Claims

I claim:

1. An adjustment mechanism comprising:

an adjuster housing having an interior portion;

an adjustment gear journaled at least partially in the interior portion of the adjuster housing, the adjustment gear having an interior surface with a drive portion and an exterior surface with a toothed portion;

a ball stud having a threaded portion and a driven portion; at least a portion of the ball stud passing through the interior surface of the adjustment gear such that the driven portion of the ball stud is selectively engageable to the drive portion of the interior surface of the adjustment gear; and

an input shaft extending from the housing, the input shaft having a bevel gear at an end thereof, the bevel gear at the end of the input shaft in engagement with the toothed portion of the adjustment gear.

2. The adjustment mechanism of claim 1 wherein the drive portion of the interior surface of the adjustment gear is a splined portion and the wherein the driven portion of the ball stud is a splined portion that corresponds to the splined portion of the adjustment gear.

3. The adjustment mechanism of claim 1 further including a VHAD in communication with the input shaft.

4. The adjustment mechanism of claim 1 further including a gasket on an exterior surface of the housing and an O-ring surrounding at least a portion of the exterior surface of the ball stud.

5. The adjustment mechanism of claim 4 wherein the O-ring and gasket are integrally over-molded to the adjuster housing.

6. The adjustment mechanism of claim 1 wherein the threaded portion of the ball stud interfaces with a lip on the housing such that rotation of the ball stud results in axial movement of the ball stud.

7. The adjustment mechanism of claim 2 wherein the adjustment gear has at least one tang selectively in clutching engagement with the splined portion of the ball stud.

8. An adjustment mechanism comprising:

an adjuster housing;

an adjustment gear at least partially journaled within the adjuster housing, the adjustment gear including a clutching means;

an input shaft extending from the housing, the input shaft having a bevel gear at an end thereof, the bevel gear on the end of the input shaft in engagement with the adjustment gear such that rotation of the input shaft causes a corresponding rotation of the adjustment gear;

a ball stud having a threaded portion and a splined portion, at least a portion of the ball stud passing through the adjustment gear, rotation of the adjustment gear causing axial movement of the ball stud; and

wherein the clutching means of the adjustment gear interacting with the splined portion of the ball stud when the ball stud is disposed at a maximum extended position such that rotation of the input shaft in a first direction results in a slipping of the adjustment gear with respect to the splined portion of the ball stud and rotation of the input shaft in a direction opposite the first direction results in engagement of the adjustment gear to the splined portion of the ball stud.

9. The adjustment mechanism of claim 8 wherein the clutching means includes at least one tang for selectively engaging the splined portion of the ball stud.

10. The adjustment mechanism of claim 8 further including a VHAD in communication with the input shaft.

11. The adjustment mechanism of claim 8 wherein the splined portion of the ball stud is selectively engageable to a splined portion on an interior surface of the adjustment gear, and wherein the threaded portion of the ball stud interfaces with a lip on the housing.

12. The adjustment mechanism of claim 8 wherein at least a portion of the ball stud is hollow.

13. The adjustment mechanism of claim 8 wherein the threaded portion of the ball stud has a first stop at one end of the threaded portion and a second stop at another end of the threaded portion of the ball stud, the first stop interacting with the lip on the housing to prevent over-extension of the ball stud and the second stop interacting with the lip on the housing to prevent over-retraction of the ball stud.

14. The adjustment mechanism of claim 12 wherein at least a portion of the hollow portion of the ball stud is hexagonally shaped.

15. A headlamp assembly comprising:

a support frame having an open front portion and at least one fixed ball stud;

a lens disposed over the open front portion of the support frame;

a reflector having a plurality of ball sockets positioned within the support frame and pivotably attached to the at least one fixed ball stud;

an adjuster housing secured to the support frame, the adjuster housing having a gear journaled at least partially within the adjuster housing, the gear having an internal splined portion, an exterior toothed portion, and a clutching means;

an input shaft having a bevel-toothed end, the bevel-toothed end of the input shaft engaging the exterior toothed portion of the gear; and

a moveable ball stud having a threaded portion and a splined portion, the threaded portion engaging a lip on the adjuster housing, the splined portion selectively engageable to the internal splined portion and the clutching means of the gear, the moveable ball stud having a ball end extending from the adjuster housing into the support frame and engaged in one of the plurality of ball sockets in the reflector.

16. The headlamp assembly of claim 15 wherein the clutching means of the gear comprises at least one tang selectively engageable with the splined portion of the ball stud.

17. The headlamp assembly of claim 16 further including a VHAD in communication with the input shaft.

18. The headlamp assembly of claim 15 wherein the ball stud is at least partially hollow.

19. The adjustment mechanism of claim 15 wherein the threaded portion of the ball stud has a stop at each end thereof.

20. An adjustment mechanism comprising:

an adjuster housing having an interior portion;

an adjustment gear journaled at least partially in the interior portion of the adjuster housing, the adjustment gear having an interior surface with a drive portion and an exterior surface with a toothed portion;

a ball stud having a threaded portion and a driven portion; at least a portion of the ball stud passing through the interior surface of the adjustment gear such that the driven portion of the ball stud is engageable to the drive portion of the interior surface of the adjustment gear;

an input shaft extending from the housing, the input shaft having a bevel gear at an end thereof, the bevel gear in engagement with the toothed portion of the adjustment gear; and

wherein rotation of the input shaft causes rotation of the bevel gear, rotation of the adjustment gear, coaction between the drive portion of the adjustment gear and the driven portion of the ball stud which causes a corresponding rotation of the ball stud, and axial movement of the ball stud.

21. An adjustment mechanism for use in connection with a headlamp assembly having a support frame, the adjustment mechanism comprising:

an adjuster housing;

an adjustment gear at least partially journaled within the adjuster housing;

an input shaft extending from the housing, the input shaft cooperating with the adjustment gear such that rotation of the input shaft causes a corresponding rotation of the adjustment gear;

a ball stud extending from the adjuster housing with at least a portion thereof passing through the adjustment gear, rotation of the adjustment gear causing axial movement of the ball stud; and

an integrally formed sealing member including a gasket portion on an exterior surface of the adjuster housing and an O-ring portion surrounding at least a portion of the ball stud.

22. An adjustment mechanism for use in connection with a headlamp assembly, the adjustment mechanism comprising:

an adjuster housing;

an adjustment gear at least partially journaled within the adjuster housing;

an input shaft extending from the housing, the input shaft cooperating with the adjustment gear such that rotation of the input shaft causes a corresponding rotation of the adjustment gear;

a ball stud extending from the adjuster housing with at least a portion thereof passing through the adjustment gear, rotation of the adjustment gear causing axial movement of the ball stud; and

an O-ring journaled within a gland inside the adjuster housing and disposed about at least a portion of the ball stud, the gland formed by the a face of the adjustment gear and an annular depression in the adjuster housing.